TransJakarta Bus Rapid Transit

Challenges towards Sustainable Transportation System of Jakarta

Illustration (kompas.com 2013)

Rachmat Rhamdhani Fauzi (z5050434)

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List of Abbreviations

BPS	*Badan Pusat Statistik* (Bureau of Statistics)
BRT	Bus Rapid Transit
DKI Jakarta	*Daerah Khusus Ibukota Jakarta* (Jakarta Special Capital Region)
ITDP	Institute for Transportation and Development Policy
Perda	*Peraturan Daerah* (Regional Regulation)
Pergub	*Peraturan Gubernur* (Governor Regulation)
PP	*Peraturan Pemerintah Republik Indonesia* (Government Regulation of Republic of Indonesia)
UNEP	United Nations Environment Programme
UU	*Undang-Undang Republik Indonesia* (National Act of Republic of Indonesia)

Introduction

As the capital and largest city of Indonesia, Jakarta is constantly facing increasing challenges in traffic congestion and dangerous pollution as an outcome of increasing use of cars and motorbikes (NYC Global Partners 2012; Shah and Nagpal [eds] 1997). According to a government report (BPS Provinsi DKI Jakarta 2014, p. 478), as per December 2013, the amount of registered motor vehicles operating in Jakarta (excluding police, army and foreign diplomat's vehicles) has reached 16,072,869 units. This number is higher than Jakarta's estimated population of 9,969,948 people in 2013 (BPS 2015, p. 9). Traffic congestions often take place in Jakarta roads and have become daily routines of this city (see Figure 1). It has been reported that the average driving speed in Jakarta is barely 5km/hour (Rudi 2015). A reliable public transport system is highly needed by this city to solve frequent traffic jams, to fulfil the city's increasing commuting demand, as well as to provide more sustainable transportation options.

Figure 1 Traffic jams have become daily routines in Jakarta (RMOL 2015)

TransJakarta is Bus Rapid Transit (BRT) transport system operating in Jakarta. It is expected to promote an "efficient and democratic use" of public transport (Hutabarat 2010, p.546). Its preliminary planning was commenced in 2001 and its first 12.9 km corridor started operating in February 2004 (Ernst 2005, p. 20; UNEP 2010). Currently, TransJakarta is the world's longest BRT system with a total length of more than 250 km comprising 12 main corridors (ITDP Indonesia 2014). Its network covers a large area of the city (see Attachment 1 and Attachment 3). Although its implementation has been accompanied with defects, TransJakarta was regarded as the fastest BRT network development in the world, covering areas previously not served by the formal public transport system (Hutabarat 2010, p. 545).

This study aims to critically assess the performance of TransJakarta and reveal factors behind the deficiencies and challenges found in its 11 years of operation. To conclude, a set of recommendations are proposed based on the evaluation of TransJakarta operation and management referring to available international BRT standard.

TransJakarta BRT within Jakarta Transportation System

BRT system has been recognised as a cost-effective option for urban public transport provision in different parts of the world (Ernst 2005, p. 20; Gunawan & Kusnandar, 2011). Considering its vital role as the main public transport covering most area of the city (ITDP Indonesia 2014), TransJakarta network should be given top priority on the Jakarta roads (Wijaya 2013).

A survey conducted by Hook et al. (2010, p.13) reveals that commuters has shifted from several previous transportation modes such as bus (55%), motor cycle (18.3%), private car (7.1%), taxi (3.5%) and *bajaj*/three wheeled taxi (2.3%) to TransJakarta BRT. The modal shift from private modes of transport (car and motorcycle) to TransJakarta BRT system has been proven to contribute reducing emissions (Ernst 2005, p. 24; Hook et al. 2010, p. 13; Nugroho, Fujiwara, & Zhang 2011, p. 655). Accordingly, priority should be given for TransJakarta on the basis of emissions reduction potential.

Regulations and Plans

Regulations, development plans and standards are the key aspects to consider in achieving best practise BRT system. By identifying strategies for the overall transportation system of the city and examining TransJakarta's role amongst different modes of transportation, viable future recommendations are presented.

In national level, *UU No. 22/2009* and *PP No. 79/2013* regulates general laws and directions on traffic and land transportation system. In relation to sustainable transportation, *Pasal 2* (Article 2) of *UU No. 22/2009* states that sustainability is one of the key principles of transportation system development in Indonesia. *PP No. 79/2013* emphasizes the importance of integration of intermodal transportation systems in both national and regional level. Specific to TransJakarta operation in regional level, three legislations take effect, including *Perda DKI Jakarta No. 10/2014*, *Perda DKI Jakarta No. 5/2014*, and *Pergub DKI Jakarta No. 63/2014*. General laws on transportation in Jakarta are regulated under *Perda DKI Jakarta No. 5/2014*. Management of Jakarta BRT system by private operators is regulated under *Perda DKI Jakarta No. 10/2014* and *Pergub DKI Jakarta No. 63/2014*.

A comprehensive report on TransJakarta development plan was published by ITDP Indonesia (2013) highlighting implementation of "direct service" system for TransJakarta. The report identified current "trunk only" system applied to TransJakarta corridors has caused low carrying capacity and problems in terms of route flexibility (ITDP Indonesia 2013, p. 4). This strategy of shifting from "trunk only" to "direct service" is expected to increase TransJakarta passenger capacity from currently 350,000 passengers per day to more than one million passengers per day. To accommodate this change, improvements on corridor infrastructure are required. While implementing this plan, it is important to refer to international standard for BRT.

International Standard

Institute for Transportation and Development Policy (ITDP) has developed "BRT Standard", an evaluation tool to assess the performance of BRT systems around the world (ITDP 2014). The standard is envisioned to ensure the delivery of best services for the passengers, and at the same time generating economic benefits and creating positive impacts to the environment.

TransJakarta should refer to this international standard to uplift its performance. Examination of criteria and assessment of TransJakarta's compliance with these criteria are needed to identify the

most effective approaches in TransJakarta improvement. The BRT Standard itself comprises of three different rankings, as listed below (ITDP 2014, p. 10).

1. Gold-standard BRT (85 points or above)
   This rank confirms achievement as international best practice BRT.
2. Silver-standard BRT (70-84 points)
   This rank comprises most components of international best practice BRT, although not all.
3. Bronze-standard BRT (55-69 points)
   This level meets the definition of BRT and has higher operational performance and service quality compared to basic BRT.

If a BRT doesn't achieve minimum 55 points to be ranked as Bronze-standard, it could be categorized as Basic-BRT, the minimum qualification of a BRT to be recognized as an operating system (ITDP 2014, p.10). The BRT Standard Scorecard shows several criteria with allocated points. These criteria fall into 7 categories including: BRT Basics, Service Planning, Infrastructure, Stations, Communications, Access and Integration and Point Deductions. See Attachment 2 for complete scorecard details of these criteria.

Problems and Challenges

Main reference of TransJakarta design and development was Transmilenio BRT system in Bogotá, Colombia (Cervero 2013, p. 12; Wijaya 2013). However, in contrast to its referenced system which was successful in achieving Gold BRT Standard for its 6 corridors (ITDP 2013), TransJakarta only managed to achieve Silver ranking for one of its corridors. Furthermore, most of TransJakarta corridors (6 out of 12) do not meet the lowest provided ranking (bronze) and merely considered as "Basic BRT" (Table 1).

Table 1 BRT Standard of TransJakarta Corridors (ITDP Indonesia 2014)

Corridor	Route	BRT Standard
1	Kota - Blok M	Silver
2	Pulo Gadung - Harmoni	Bronze
3	Kalideres - Pasar Baru	Bronze
4	Pulo Gadung - Dukuh Atas	Bronze
5	Ancol - Kampung Melayu	Bronze
6	Dukuh Atas 2 - Ragunan	Bronze
7	Kampung Melayu - Kampung Rambutan	Basic BRT
8	Lebak Bulus - Harmoni	Basic BRT
9	Pluit - Pinang Ranti	Basic BRT
10	Tanjung Priok - PGC 2	Basic BRT
11	Kampung Melayu - Pulo Gebang	Basic BRT
12	Pluit - Tanjung Priok	Basic BRT

Since its first operation in 2004, challenges and problems have been surrounding the TransJakarta project. Jakarta with its TransJakarta is considered as one of the cities in the world which failed to achieve high-quality BRT services (Cervero 2013, p.39). Several problems and shortcomings have been identified as described below.

1. Capacity

Regardless its status as the largest BRT network in the world with more than 250 km total length of corridors (ITDP Indonesia 2014), TransJakarta has a significantly lower passenger capacity compared

to other BRT systems in the world (Figure 2). Currently, corridor 1 of TransJakarta has the highest passenger volume with 40 buses per hour in one direction carrying 3400 passengers in one peak hour (ITDP Indonesia 2013). This carrying capacity is far below capacity of best practise BRT systems such as Transmilenio in Bogota (37,700 passengers per hour in one direction) (IPTD Indonesia 2013, p.4). This fact indicates TransJakarta needs more improvements in many aspects to attract more passengers (Gunawan & Kusnandar, 2011).

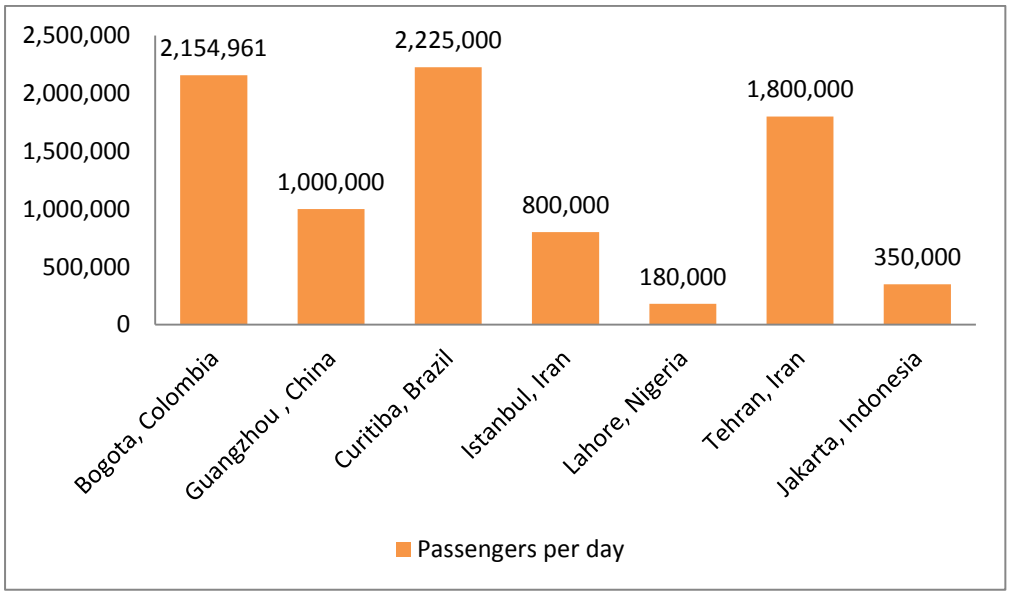

Figure 2 Passengers per day of different BRT systems (ITDP Indonesia 2014; Themsche 2015, p.262)

2. Design issues and delivery issues

Flaws have been identified with respect to TransJakarta design and construction (Ernst 2005, p. 24). Insufficient upgrading of road surface has caused road degradation at some stops. Capacities of several stations are below levels of passenger demand. Several stations are too narrow due to little modification to fit existing median width.

Although TransJakarta was adapted from Transmilenio system, several major differences in its design were found. Transmilenio system has 4 dedicated lanes (two lanes for each direction) while TransJakarta has only one dedicated lane for each direction. Having two lanes in one direction is important to maintain reliability of the service. In the case of TransJakarta, if a bus has stopped working in the middle of service during the peak hour, the whole system of that corridor may stop immediately. This is because the buses behind are not able to take over while the neighbouring regular lane is already having traffic congestion.

Figure 3 Transmilenio (left), Guangzhou BRT (middle) and TransJakarta (right) (Lightrailnow.org n.d.; IPTD China 2015; Rakyat Merdeka n.d.)

Another option to consider is having dedicated lanes on both directions and not separated in the middle, similar to Guangzhou BRT design. This will allow a more flexible use of the lanes and thus ensuring a more reliable the service. Figure 3 above shows different dedicated lane configurations of these three BRT systems.

In TransJakarta first phase, lack of integration between trunk and feeder transport system has caused poor patronage and traffic congestion (Wright 2011). On the other hand, the "trunk only" system doesn't work effectively and has resulted in low carrying capacity. As mentioned earlier, this issue can be solved by implementing shifting to "direct service" system (ITDP Indonesia 2013). Figure 4 below displays the difference between three BRT systems.

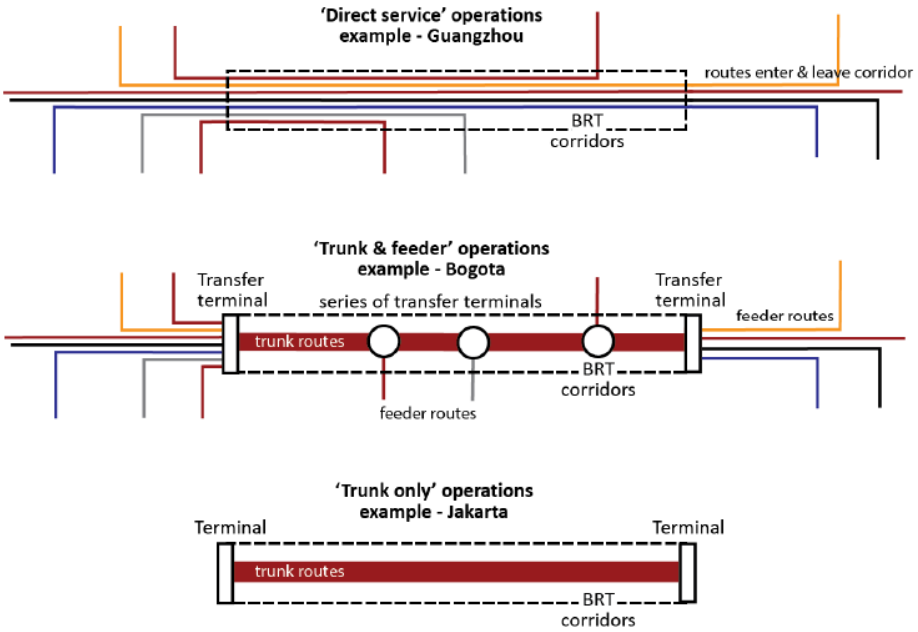

Figure 4 Comparison of direct service, trunk and feeder and trunk only system (ITDP Indonesia 2013, p. 6)

"Direct service" system has several advantages compared to "trunk & feeder" or "trunk only" system (ITDP Indonesia 2013, p. 8) such as: increasing passengers volume, reducing passenger's transfer times, reducing traffic congestions on the regular lanes, etc.

3. Operational issues

With an estimated cost of US$ 1 million/km, TransJakarta construction was identified as the lowest cost of BRT system in the world (Cervero 2013, p. 26; Ernst 2005, p. 22). Low cost budget on the initial construction of TransJakarta infrastructure components has resulted in high maintenance cost and additional construction cost (Ernst 2005, p. 23).

Several major incidents have also occurred during its 11 years operation. One of the latest ones was a large fire on Tuesday, 1 September 2015 at a TransJakarta bus depot in Rawa Buaya, Jakarta, destroying 18 buses (Tambun & Marhaenjati 2015). The following are examples of accident involving TransJakarta:

23 March 2015 – gas fuel was leaking (Arjawinangun 2015),
20 May 2015 – machine was releasing smoke (Yuanita 2015),
3 July 2015 – TransJakarta bus catches fire and explodes at a station (Figure 5) (Setyowibowo 2015),
18 July 2015 – TransJakarta bus catches fire at a station (Belarminus 2015),

1 September 2015 – TransJakarta depot was on fire (Tambun & Marhaenjati 2015).

The above list covers incidents happened in the last few months and only related to fire. The list will be much longer if accidents involving failure, crashes, and incidents happened in the past 11 years are included.

Figure 5 TransJakarta bus exploded (Setyowibowo 2015)

4. Transparency and institutional issues

In 2003, prior to TransJakarta launching, a technical review published by IPTD (2003, p. 7) points out that the contracting of TransJakarta Phase 1 has been done in "a non-transparent manner". Lately this year, a corruption case dragging former chairman of Jakarta Transportation Directorate was revealed (Laluhu, 2015), with indicated national treasury loss of nearly half a trillion Indonesian Rupiahs.

Recommendations and Conclusions

Building a sustainable transportation system for a large and complex city as Jakarta is not an easy task. TransJakarta BRT system was projected to be a sustainable solution for the city's increasing transportation demand. TransJakarta has been developed and run for the last 11 years with different problems and shortcomings: inefficiency (low carrying capacity), physical issues (design and construction), operational issues (mismanagement) and political issues (lack of transparency and corruption). These problems are interconnected.

Referring to the best practice BRT systems in the world, they share a common legacy of strong and visionary political leadership (Cervero 2013, p. 39). Regulations and development plans have been studied and carried out extensively. International standards are available with clear criteria. Implementation has always been the problem. A professional public service is characterized by the existence of accountable and responsible provider (government apparatus) with the following criteria: effective, simple, transparent, efficient, responsive, timely and adaptive (Suwarno & Ikhsan 2006). If these qualities are existed in TransJakarta development and operation, TransJakarta will be the next successful gold-ranked sustainable BRT system.

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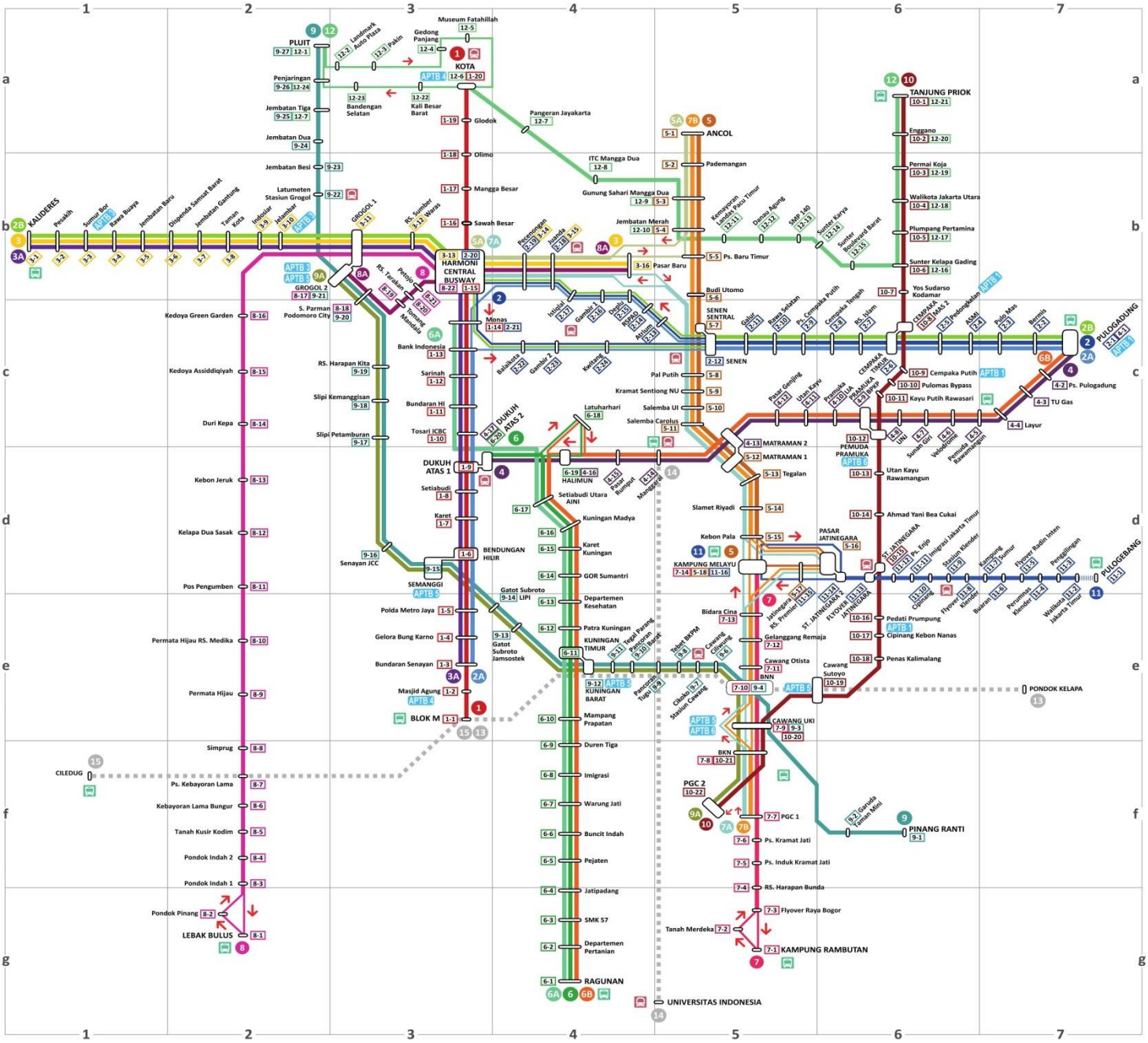
Attachments

Attachment 1 – TransJakarta network map (PT Transportasi Jakarta 2013)



Attachment 2 – The BRT Standard Scorecard (ITDP 2014, p.13)

CATEGORY	MAX SCORE	CATEGORY	MAX SCORE
BRT BASICS		COMMUNICATIONS	
• Dedicated Right-of-Way	(8 points)	• Branding	(3 points)
• Busway Alignment	(8 points)	• Passenger Information	(2 points)
• Off-board Fare Collection	(8 points)		
• Intersection Treatments	(7 points)		
• Platform-level Boarding	(7 points)		
SERVICE PLANNING		ACCESS AND INTEGRATION	
• Multiple Routes	(4 points)	• Universal Access	(3 points)
• Express, Limited, and Local Services Control Center	(3 points)	• Integration with Other Public Transport	(3 points)
• Located in Top Ten Corridors	(3 points)	• Pedestrian Access	(3 points)
• Demand Profile	(2 points)	• Secure Bicycle Parking	(2 points)
• Hours of Operations	(3 points)	• Bicycle Lanes	(2 points)
• Multi-corridor Network	(2 points)	• Bicycle-Sharing Integration	(1 point)
	(2 points)		
INFRASTRUCTURE		POINT DEDUCTIONS*	
• Passing Lanes at Stations	(4 points)	• Commercial Speeds	(-10 points)
• Minimizing Bus Emissions	(3 points)	• Minimum Peak Passengers per Hour per Direction Below 1,000	(-5 points)
• Stations Set Back from Intersections Center Stations	(3 points)	• Lack of Enforcement of Right-of-Way	(-5 points)
• Pavement Quality	(2 points)	• Significant Gap Between Bus Floor and Station Platform	(-5 points)
	(2 points)	• Overcrowding	(-5 points)
STATIONS		• Poorly Maintained Busway, Buses, Stations, and Technology Systems	(-10 points)
• Distances Between Stations	(2 points)	• Low Peak Frequency	(-3 points)
• Safe and Comfortable Stations	(3 points)	• Low Off-Peak Frequency	(-2 points)
• Number of Doors on Bus	(3 points)		
• Docking Bays and Sub-stops	(1 point)		
• Sliding Doors in BRT Stations	(1 point)		

*) Point deductions are only relevant to systems already in operation.

Attachment 3 – Coverage of TransJakarta Network (ITDP Indonesia 2013, p.7)